

REMARKS

Claims 1–12, 14–18, and 46 are pending. Claims 19–35 are withdrawn from consideration.

Applicants thank the Examiners for the courtesy of the telephonic interview conducted with the Applicants' attorney on July 17, 2007.

Amendments to the Claims

Claim 1 has been amended to recite “a photoelectrochemical label selective for non-covalently binding double-stranded nucleic acids over single-stranded nucleic acids *contacting* the nucleic acid probe.” Support for this amendment is found in the Specification, for example, in ¶ [0040].

Claim 1 has been amended to recite “a sacrificial reductant *contacting* the nucleic acid probe.” Support for this amendment is found in the Specification, for example, in ¶ [0040].

Claim 1 has been amended to recite “an *electric* light source.” Support for this amendment is found in the Specification, for example, in ¶ [0024].

Withdrawn claims 20–27, 29, 30, and 32 have been amended to correct their dependencies.

New claim 46 recites in part a support comprising nucleic acid probe attached to an electrode. Support for this feature is found in the Specification, for example, in ¶ [0023]. Claim 46 also recites light sources in Markush format. Support for this feature is found in the Specification, for example, in ¶ [0024].

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1–11 and 14–18 stand rejected under 35 U.S.C. § 112, second paragraph as indefinite. The Examiner objects that the recitation of a photoelectrochemical label and a sacrificial reductant in claim 1 are not structural limitations. Applicants submit the amendments to claim 1 reciting that the photoelectrochemical label and the sacrificial reductant “contacting the nucleic-acid probe” overcome this rejection.

Claim Rejections Under 35 U.S.C. § 102(b)

Claim 1, 2, 4, 6–10, and 14–17 stand rejected as anticipated by Hashimoto (U.S. Patent No. 5,776,672). “A claim is anticipated only if each and every element as set forth in the claim is

found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Independent claim 1 as amended recites in part “an electric light source.” Hashimoto does not disclose an electric light source. In particular, the Examiner relies on an apparatus illustrated in FIG. 4 of Hashimoto and described in the Specification at col. 29, lines 24 to col. 30, line 13 in which light is generated by electrochemiluminescence of an intercalating agent, which is not an “electric light source.” Hashimoto at 29:63–30:9. The Examiner also characterizes an optical fiber 37 as a “light source.” Hashimoto describes the function of the optical fiber 37 as follows: “light caused by the electrochemiluminescence is brought via optical fiber 37 to photomultiplier 40.” Hashimoto at 30:6–8. Accordingly, the optical fiber 37 is a conduit for light, and is not only not an “electric light source,” it is not even a “light source.” Accordingly, because Hashimoto does not disclose every feature recited in claim 1, Hashimoto does not anticipate claim 1 for at least this reason. Because claims 2, 4, 6–10, and 14–17 are dependent on claim 1 and recite additional features, claims 2, 4, 6–10, and 14–17 are also not anticipated by Hashimoto for at least the same reason.

During the interview, the Examiner noted that Hashimoto discloses light-based detection, for example, by circular dichroism, and suggested that the disclosed methods may include the use of an electric light source. Hashimoto discusses circular dichroism and other spectroscopic detection methods several times. Although Hashimoto does not discuss these detection methods in conjunction with the apparatus cited by the Examiner, the following addresses such a combination for the sake of argument. As discussed above, the Examiner cites an apparatus that detects electrochemiluminescently generated light from an intercalating agent. Irradiating a sample with an electrical light source sufficient to generate a spectroscopic signal in addition to the electrochemiluminescent signal would overwhelm the electrochemiluminescent signal. Because Hashimoto also discloses electrochemical detection of the intercalating agent in the same portions of the description that it discusses the spectroscopic detection techniques, it appears that Hashimoto discloses standard electrochemical detection as an auxiliary detection method for the electrochemiluminescence detection cited by the Examiner. Neither the electrochemical detection nor the electrochemiluminescence detection includes an electric light source.

Claim 1 would also not be obvious over Hashimoto because Hashimoto does not suggest modifying the cited apparatus with an electric light source. Irradiating the nucleic acid probe and non-covalent photoelectrochemical label, which are recited in claim 1, with an electric light source of sufficient intensity to would overwhelm a electrochemiluminescent signal from the photoelectrochemical. Accordingly, one skilled in the art would not be motivated to modify the apparatus cited by the Examiner with an electric light source. Accordingly, claim 1 is also not obvious over Hashimoto for at least this reason.

Claim Rejections Under 35 U.S.C. § 103(a)

A *prima facie* rejection for obviousness requires a showing of at least: a disclosure or suggestion of every element of the claim in the cited reference or references; and a reasonable expectation of success. The reasonable expectation of success must be found in the cited references or known to one skilled in the art. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claims 1, 3, and 5 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hashimoto, as evidenced by U.S. Patent Publication No. 2004/062930 A1 (Roberts), in view of U.S. Patent No. 5,482,834 (Gillespie). The Examiner relies on Roberts for disclosing that primary amines are sacrificial reductants, and on Gillespie for disclosing RNA immobilized on solid supports. As discussed above, Hashimoto does not disclose or suggest the electric light source recited in claim 1. Because Roberts and Gillespie do not cure this deficiency, claim 1 is not obvious over the combination of Hashimoto, Roberts, and Gillespie for at least this reason. Because claims 3 and 5 are dependent on claim 1, claims 3 and 5 are also not obvious over the cited combination for at least the same reason.

Claims 1 and 11 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hashimoto, as evidenced by Roberts, in view of U.S. Patent No. 5,871,628 (Dabiri). The Examiner relies on Dabiri only for disclosing a laser light source, and states as a motivation, providing the apparatus with a light source with frequencies compatible with a wide variety of fluorescent dyes. In the apparatus cited by the Examiner in Hashimoto, light is generated in an electrochemiluminescence reaction by applying a potential to an intercalating agent. This light is then detected. Adding a laser, or any other light source, to this apparatus serves no purpose: light is an output of the apparatus, not an input. Accordingly, one skilled in the art would not modify the apparatus by

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adding a laser. Accordingly, claims 1 and 11 are not obvious over the cited references for at least this reason.

Claims 1 and 18 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hashimoto, as evidenced by Roberts, in view of U.S. Patent No. 6,362,004 (NobleTT). The Examiner relies on NobleTT only for disclosing microarrays of immobilized nucleic acids comprising machine readable identifying indicia. As discussed above, Hashimoto does not disclose or suggest the electric light source recited in claim 1. Because Roberts and NobleTT do not cure this deficiency, claim 1 is not obvious over the combination of Hashimoto, Roberts, and NobleTT for at least this reason. Because claim 18 is dependent on claim 1, claim 18 is also not obvious over the cited combination for at least the same reason.

Rejoinder of Withdrawn Claims

Because the pending claims are allowable over the art of record, Applicants request rejoinder of the withdrawn claims and examination of the same under M.P.E.P. 821.04, which provides for rejoinder of any claim that requires all the limitations of an allowable claim. Because withdrawn claims 19–30 and 32–35 recite every feature of claim 1, Applicants request rejoinder of these claims.

Applicants submit that all claims are now allowable over the reference of record for at least the reasons provided above. Applicants believe that the amendments and arguments provided in this paper are sufficient to overcome all of the Examiner's outstanding rejections. Applicants have not presented every possible reason that the pending claims are allowable over the cited references, and as such, do not acquiesce to any of the Examiner's characterizations of the pending claims, characterizations of the cited references, or arguments not specifically traversed. If the Examiner believes that any outstanding issues remain that may be resolved in a telephonic interview, the Examiner is invited to contact the undersigned.

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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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